

HOT FILL BOTTLE

5 INTRODUCTION

This invention relates to a hot fill bottle and more particularly a hot fill drink bottle manufactured from blow moulded polyester resin usually polyethylene terephthalate (PET).
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BACKGROUND OF THE INVENTION

Hot fill PET bottles have become increasingly popular as an attractive sturdy throw away drinks container. The process for manufacturing and filling a hot fill bottle is to fill the moulded PET bottle with liquid at a temperature of about 83°C, and sealing the container whilst the liquid is hot in order to provide adequate sterilisation. The filling of the bottle at that temperature and subsequent cooling to room temperature causes, in a 700ml bottle, about 25ml to 30ml contraction of the contents. As the PET bottles are filled there is a slight expansion caused by the gravitational effect of the hot liquid on the softening plastics. However, as the contents cool they contract thereby creating a partial vacuum in the heated bottles. The partial vacuum can, unless restricted by the structure of the bottle, cause uncontrolled distortion of the wall(s) of the bottles.
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Uncontrolled distortion can give the bottles a mis-shaped appearance that makes labelling of the bottles difficult and detracts from the marketability of the end product.

Considerable amount of research and design has gone into designing the profile of a bottle that can facilitate the contracting without distorting the end shape and appearance of the bottle. One such well known

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proposal is to provide a series of thermal expansion panels in a lower portion of the bottle. These panels usually number six and are equally spaced around the periphery of the bottle. The panels have a projecting 5 cricket bat like profile that contracts inwardly to compensate for the volume reduction as the contents cool to room temperature. The thermal expansion panels ensure that the remainder and more aesthetically critical components of the container do not distort. It is usual 10 to cover up the thermal expansion panels with a label to disguise their somewhat unsightly nature.

There have been other suggestions of varying the number and positioning of the panels to achieve the same 15 contraction function.

Hot fill PET bottles of the kind described are also designed to be aesthetically pleasing and have ribs and other strengthening devices incorporated in the 20 profile of the bottle to ensure that the bottle can withstand the stresses that it would be subjected to in use. The designers of bottles of this kind also often wish to include in the bottle structure itself embossed trade marks by way of words or devices.

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It is these issues that have brought about the present invention.

SUMMARY OF THE INVENTION

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In accordance with the present invention there is provided a hot fill bottle of polymeric material having a plurality of thermal expansion panels equally positioned around the periphery of the bottle and three dimensional 35 logos embossed into the wall of the bottle characterised in that the three dimensional logos constitute, at least in part, the thermal expansion panels.

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Preferably, three equally spaced thermal expansion panels are positioned around the bottle.

5 The three dimensional logos each comprise two concave tear drop shapes interconnected by a raised land whereby the tear drop shapes flex to compensate for volume changes of the bottle.

10 Preferably, the bottle is blow moulded in polyester resin, usually polyethylene terephthalate (PET).

DESCRIPTION OF THE DRAWINGS

15 Embodiments of the present invention will now be described by way of example only with reference to the accompanying drawings in which:

Figures 1 to 3 are side elevational views of a hot fill PET bottle viewed from different angles,

20 Figure 4 is a cross sectional view taken along the lines A-A of Figure 1,

Figure 5 is an enlarged detail of the part of Figure 4 within the circle B,

25 Figures 6 to 8 are side elevational views of a hot fill PET bottle in accordance with a second embodiment viewed from different angles,

Figure 9 is a cross sectional view taken along the lines A-A of Figure 6, and

30 Figure 10 is an enlarged view of the part of Figure 9 within the circle B.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

35 The drawing Figures 1 to 10 illustrate two embodiments of hot filled PET bottles. The embodiments are of a similar design and thus only one is described in detail.

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In the embodiment shown in Figures 1 to 5 a PET bottle 10 comprises a base 11, a body 12 that is divided into a lower portion 13 and torso portion 14. The torso portion merging into a shoulder 15 which in turn terminates in an externally threaded neck 16. The threaded neck 16 is adapted to support an internally threaded cap or closure (not shown). The lower body portion is of substantially circular cross section and is provided with a series of (preferably four) strengthening ribs 20. Adjacent strengthening ribs are separated by an annular groove 21. A wider annular groove 22 separates the lower body portion 13 from the torso portion 14. The torso portion 14 is also substantially of circular cross section with a slight taper towards the neck 16 of the bottle 10. The torso portion 14 comprises three equally spaced lands 25, 26, 27 each separated by thermal expansion panels 30, 31, 32 so that the whole portion is constituted by the three lands 25, 26, 27 and the three panels 30, 31, 32. Each land 25, 26, or 27 is embossed with the trade mark AQUAVETA™ that extends substantially along the length of the land in a substantially two dimensional array of lettering.

Each thermal expansion panel 30, 31, 32 comprises a substantially planar area 40 that has positioned centrally thereof two tear drop shaped recesses 41, 42. The recesses 41, 42 are separated by a S-shaped upstanding land 43. The tear drop recesses 41, 42 define concave panels that can flex relative to their periphery, thus allowing the bottle to accommodate contraction caused by cooling of the liquid.

In the embodiment shown in Figures 6 to 10, a substantially similar bottle 10 is illustrated except that in this embodiment the three lands 25, 26, 27 that carry the embossed word trade mark have the trade mark

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positioned in a bone shaped ribbed border 50.

Furthermore, the thermal expansion panels 30, 31, 32 whilst they still incorporate two tear drop shaped recesses 41, 42 joined by an S-shaped land 43, the recesses 41, 42 are enclosed within a raised rib 52 that defines an oval shaped space that contains the tear drop recesses 41, 42.

10 In both the embodiments the tear drop shaped recesses 41, 42 constitute a three dimensional logo that serves as an additional trade mark.

15 The hot fill PET bottle 10 described in both the above embodiments elegantly incorporates a three dimensional logo with the thermal expansion panel. Thus, instead of the thermal expansion panels contributing to an unsightly component of the bottle that needs to be covered up by a label, it is now possible to make the thermal 20 expansion panel double as an eye catching logo. In this case, a three dimensional dual tear drop logo.

25 The invention in its broadest aspect envisages many types of three dimensional logo and a variety of a number of thermal expansion panels. The embossed trade mark that is in the preferred embodiment could vary or be omitted. It is understood that the capacity and size of the bottle could vary, for example from about 350ml to 1.5 litre through 500ml and 700ml and 1L sizes.